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Subsurface Oxygen Sensor Specifications

Part #:	JS-XT253-XX, (were XX = length in feet)
Sensor Type:	Electrochemical cell
Sensor Life:	≈ 7 years
Temperature Compensation:	Internal Thermistor
Pressure Compensation:	None (see pressure compensation notes)
Accuracy (full scale):	≈ 1% for oxygen depleting (calibration at 20.9%)
Storage Temperature:	0 - 70° C
Storage and Operating Orientation:	Vertical
Operating Temperature:	0 - 70° C
Output Signal:	mV or 4-20mA
Maintenance Required:	None
Calibration Requirements:	Calibrate in air before installation (see long term stability fig. 1)
Installation Methods:	2" or larger monitoring well or directly buried in soil
Response Time:	12 Sec. (5 min. for temperature compensation)

Influence of Various Gases

Influence Level	Gas Type
Unaffected	CO ₂ , CO, H ₂ S, SO ₂ , H ₂ , CL ₂ , CFC's, CH ₄ , N ₂ , etc...
Affected	Nh ₃ (ammonia), Ozone

Pressure Influence

The oxygen sensor is responsive to partial pressure of oxygen molecules which enter the sensor through a Teflon membrane. The effects from a change (from calibration point) in atmospheric pressure can be corrected by recalibration of sensor. It is recommended to calibrate the sensor on site to compensate for pressure-altitude equivalents (e.g. -531 ft. = 1033mB, sea level = 1013mB, 5974 ft. = 813mB).

The following equation represents the effect of pressure influence on the sensor.

$$V_o = V_{os} \times (P/1013) \quad \text{where... } P = \text{pressure (mB)}$$

$$V_{os} = \text{voltage at 1013 mB}$$

$$V_o = \text{voltage output (mV)}$$

$$V_{os} = 44.3\text{mv @ } 1013 = 20.9\% \text{ O}_2, \quad C_f = .5, \quad \approx \% \text{O}_2 = C_f \times (V_o - 2.5)$$

$$29.3 \text{ in. Hg. (sea level - storm conditions)} \quad 20.5\% \text{ O}_2 = .5 \times ((44.3 \times 992/1013) - O_v)$$

$$29.9 \text{ in. Hg. (sea level - calm conditions)} \quad 20.9\% \text{ O}_2 = .5 \times ((44.3 \times 1013/1013) - O_v)$$

$$30.5 \text{ in. Hg. (sea level - storm conditions)} \quad 21.3\% \text{ O}_2 = .5 \times ((44.3 \times 1033/1013) - O_v)$$

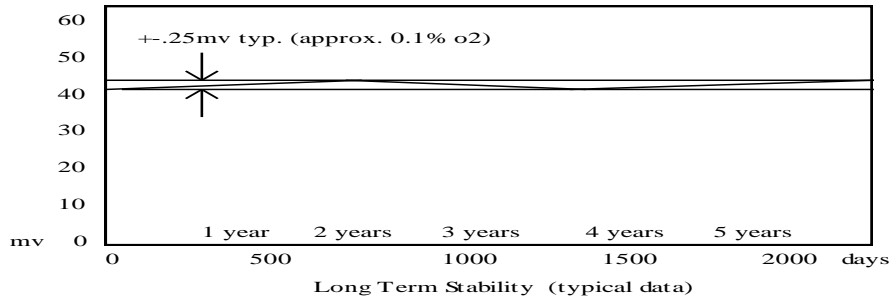
$$\text{were... } O_v = \text{offset voltage @ } 0\% \text{ O}_2 = \approx 2.5\text{mV}$$

$$C_f = \text{calibration factor} = 20.9/(V_o @ 20.9 \text{ O}_2 \% - O_v)$$

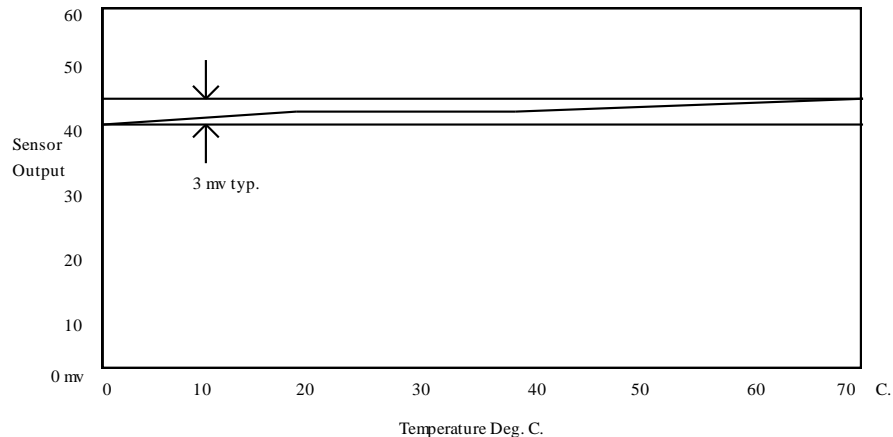
As shown above, considerable changes in barometric pressure is not great enough to produce serious degradation in sensor performance for long term remediation monitoring applications. Studies indicate that for in-situ O₂ monitoring possible diurnal change caused by various impending factors affect subsurface O₂ concentration levels (see oxygen sensor applications literature).

Subsurface Oxygen Sensor Specifications Cont.

Long Term Stability (fig. 1)



Temperature Compensation (fig. 2)



Sensitivity Characteristics (fig. 3)

